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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: **Arndt et al.**

Serial No.: **09/631,723**

Filed: **August 3, 2000**

For: **Permanent Open Firmware PCI Host Bridge (PHB) Unit Addressing to Support Dynamic Memory Mapping and Swapping of I/O Drawers**

§ Group Art Unit: **2112**

§

§ Examiner: **Lee, Christopher E.**

§

§ Attorney Docket No.: **AUS9-2000-0316-US1**

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By: Rebecca Clayton
Rebecca Clayton

TRANSMITTAL DOCUMENT

Commissioner for Patents
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Sir:
ENCLOSED HEREWITH:

- Appellant's Brief (in triplicate) (37 C.F.R. 1.192); and
- Our return postcard.

A fee of $330.00 is required for filing an Appellant's Brief. Please charge this fee to IBM Corporation Deposit Account No. 09-0447. No additional fees are believed to be necessary. If, however, any additional fees are required, I authorize the Commissioner to charge these fees which may be required to IBM Corporation Deposit Account No. 09-0447. No extension of time is believed to be necessary. If, however, an extension of time is required, the extension is requested, and I authorize the Commissioner to charge any fees for this extension to IBM Corporation Deposit Account No. 09-0447.

Respectfully submitted,

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Docket No. AUS9-2000-0316-US1

PATENT

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ATTENTION: Board of Patent Appeals and Interferences

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APPELLANT'S BRIEF (37 C.F.R. 1.192)

This brief is in furtherance of the Notice of Appeal, filed in this case on March 2, 2004.

The fees required under § 1.17(c), and any required petition for extension of time for filing this brief and fees therefore, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief is transmitted in triplicate. (37 C.F.R. 1.192(a))

REAL PARTIES IN INTEREST

The real party in interest in this appeal is the following party: International Business Machines Corporation.

RELATED APPEALS AND INTERFERENCES

With respect to other appeals or interference's that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal, there are no such appeals or interference's.

STATUS OF CLAIMS

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: Claims 1-21

B. STATUS OF ALL THE CLAIMS IN APPLICATION

1. Claims canceled: None
2. Claims withdrawn from consideration but not canceled: None
3. Claims pending: Claims 1-21
4. Claims allowed: None
5. Claims rejected: Claims 1-21

C. CLAIMS ON APPEAL

The claims on appeal are: Claims 1-21

STATUS OF AMENDMENTS

In response to an Office Action dated 9/17/2003, and amendment was filed by Appellants on 12/09/2003. The Examiner finally rejected all claims in a Final Office Action dated 1/15/2004. Appellants did not file any amendment to the claims in response to this Final Office Action.

SUMMARY OF INVENTION

A method, system and computer program product for managing input/output drawers within a data processing system. The input/output drawers are modular structures that contain input/output or other types of electrical, electronic or mechanical devices typically used in a data processing system. A unique identifier is assigned to each of the plurality of input/output drawers, and is used by the operating system to identify the plurality of input/output drawers. This unique identifier does not change when reconfiguring at least one of the input/output drawers within the data processing system, and therefore the unique identifier that is used by the operating system to identify each of the drawers in the data processing system remains the same regardless of how the input/output drawers are interconnected by cables. This provides a degree of hardware interconnect transparency to the operating system, such that the operating system and associated software applications do not have to change or update how they access these drawers even when the drawer interconnection gets modified such as by adding a new drawer or removing an existing drawer.

Referring to Appellants' Figure 3, there is shown a plurality of I/O drawers 304, 306 and 308. These I/O drawers are modular structures that are easy to install and remove, allowing for easy modification of the data processing system (Col. 2, lines 10-14). These drawers are interconnected by high-speed cables to form the overall data processing system (Specification Col. 2, line 27 – Col. 3, line 7). In the preferred embodiment, service processor 302 assigns a unique identification to each of the I/O drawers within the system (Specification page 14, lines 3-6). System firmware 326 dynamically discovers the I/O drawers and assigns memory mapping to each one of the drawers and their associated PCI Host Bridges (PHB) 310-320 using these uniquely assigned identifiers (Specification page 15, lines 1-6). Since the unique identifier is permanently associated with and maintained by service processor 302 in NVRAM 322, access to devices contained with the drawers by the operating system and associated software applications such as Object Data Management (ODM) remains the same irrespective of how the drawers are interconnected together (Specification page 15, line 27 – page 16, line 3). For example, if one of the I/O drawers is moved to a different physical location within the system, no action is required on the part of the user for system reconfiguration (Specification page 16, line 13-24).

ISSUES

I. Whether the rejection of Claims 1, 3, 8, 10, 15 and 17 under 35 U.S.C. 103(a) is proper.

II. Whether the rejection of Claims 2, 4-7, 9, 11-14, 16 and 18-21 under 35 U.S.C. 103(a) is proper.

GROUPING OF CLAIMS

Claims 1-21 do not stand or fall together and Appellants consider the following groups of claims to be separately patentable:

Group I 1, 3, 8, 10, 15 and 17

Group II 2, 4-7, 9, 11-14, 16 and 18-21

Appellants consider the claims in Group II to be separately patentable, in that the Examiner has improperly combined references in an attempt to establish that the claimed feature of "responsive to a determination that a new input/output drawer has been added to the data processing system, assigning a new unique identifier to the new input/output drawer, wherein the new unique identifier is different from any of the unique identifiers previously assigned, such that each of the plurality of input/output drawers maintains the same unique identifier" is obvious.

ARGUMENT

I. 35 U.S.C. § 102, Anticipation (Group I Claims)

The Examiner rejected Claims 1, 3, 8, 10, 15 and 17 under 35 U.S.C. § 102(e) as being anticipated by Berglund et al. (US 6,044,411).

With respect to Claims 1, 8 and 15, such claims recite that a unique identifier is assigned to each of the plurality of drawers, and this unique identifier is used by the operating system to identify the plurality of drawers regardless of how the drawers are interconnected by cable. Appellants show that Berglund teaches that his physical addresses (which as will be shown below are being interpreted by the Examiner as reading on the claimed 'unique identifier') are composed using the *actual physical locations* of its components, in order to enhance the ability to locate the physical location of a device (Berglund Col. 2, lines 49-53, Col. 4, lines 22-24 and lines 37-52). As described at Berglund Col. 7, lines 12-39, when the system is turned on, the SPCN writes *unique physical location addresses* into the respective memory, specifying the associated enclosure and the particular backplane. The operating system reads the enclosure/backplane physical location address information when building a mapping of logical addresses to physical location addresses (Bergland Col. 7, lines 49-56). Thus, it is shown that since Berglund uses actual physical device location information when constructing its logical address mapping, the physical addresses used when accessing a device *do change* when the device is re-cabled to be at another physical location within the system, since the physical address used to access the device is comprised of its physical enclosure/tower location information (Col. 4, lines 40-43) which would change when the device is re-cabled. See, in particular, Bergland's discussion at Col. 8, lines 42-52, where Bergland describes this exact scenario (and reproduced herein):

> "In some systems, such as those having multiple buses, it is advantageous to store bus identification information in non-volatile memory (NVRAM) associated with the backplane. In this way, *should an enclosure be removed and relocated at a different position on the main bus*, that is, be at a different logical bus "drop" point, a unique bus identifier persists in the NVRAM, so

that system bus configuration information can be maintained *and updated* in the operating system and NVRAM. (emphasis added by Appellants)

This is in contrast to the claimed invention, where techniques for identifying or accessing devices contained within the drawers *do not change* when the drawers are relocated to a different position on the system bus by re-cabling, since a unique identifier is used by the operating system to identify the drawers regardless of how the input/output drawers are interconnected by cable.

Appellants further show that, in addition to Bergland's physical addresses being changed when a drawer is relocated, it is also entirely possible that Bergland's logical addresses are changed as well. As stated by Bergland at Col. 14, lines 23-29:

"At each enclosure (tower) there is a bus "drop," and each bus drop is given a number stored in NVRAM. The bus drop number stored in NVRAM is used to correlate the bus drop to the logical address. In this way, from IPL to IPL, or even during concurrent maintenance, a system enclosure (tower) may be re-attached in a different physical position on the system bus, or removed completely. The bus identification in NVRAM can be used advantageously to correlate a moved tower to a possibly new logical identification." (emphasis added by Appellants)

Thus, when a Bergland system enclosure is moved, the physical address used when accessing devices contained therein do change. This is so, as the bus drop number changes to reflect the new bus location, and this bus drop number is a part of the system enclosure identifier (as described immediately above). In addition, as stated above by Bergland at Col. 14, lines 27-29, the moved tower may be given a new logical identification. Thus, it is shown that Bergland does *not* teach the claimed feature of "*wherein the unique identifier is used by an operating system to identify the plurality of input/output drawers regardless of how the input/output drawers are interconnected by cables*, such that physical addresses used when accessing devices contained within said plurality of input/output drawers do not change when reconfiguring at least one of said plurality of input/output drawers within the data processing system by physical insertion, physical removal or physical rearrangement, wherein the physical addresses that do not change

include physical addresses used when accessing devices contained within the reconfigured drawer(s)".

Applicants further show that while Berglund teaches a logical to physical mapping of addresses, this logical to physical mapping is performed during each system IPL (initial program load) (Berglund Col. 7, lines 49-67). There is no indication whatsoever that the logical addresses are maintained at their same values between successive IPLs regardless of cable interconnect. Specifically, Berglund does not teach assigning a unique identifier to each of a plurality of input/output drawers, wherein the unique identifier is used by an operating system to identify the plurality of input/output drawers regardless of how the input/output drawers are interconnected by cables.

In the 35 USC 102 claim rejection, the Examiner equates Berglund's unique physical location address to the claimed unique identifier. This is shown on page 2 of the most recent office action dated 1/15/2004. There, in line 7 of paragraph number 3, the Examiner states"

> "first instructions for assigning (i.e. defining) a unique identifier (i.e., unique physical location address; see col. 7, lines 40-44 and 47)"

In addition, at line 11 of this same paragraph number 3, the Examiner states:

> "wherein said unique identifier (i.e., unique physical location address) is used by the operating system to identify said plurality of input/output drawers regardless of how said input/output drawers are interconnected by cable."

It is thus clear that *the Examiner is interpreting Berglund's unique physical location address as reading on the claimed 'unique identifier'*. It is respectfully shown that Berglund's unique physical location address does change if the enclosure is re-cabled to another location (Berglund Col. 8, lines 42-52). Thus, the features of the claimed unique identifier are not taught by the cited reference even when using the Examiner's interpretation of Berglund's unique physical address reading on the claimed unique identifier, as Berglund's physical address does change when the enclosure is re-cabled to another location.

For a prior art reference to anticipate in terms of 35 U.S.C. 102, every element of the claimed invention must be identically shown in a single reference. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990). As shown above, every element of the claimed invention is not identically shown in a single reference, and therefore Claims 1, 8 and 15 are shown to have been erroneously rejected under 35 U.S.C. 102.

II. 35 U.S.C. § 103, Obviousness (Group II Claims)

The Examiner rejected Claims 2, 5, 9, 12, 16 and 19 under 35 U.S.C. § 103 as being unpatentable over Berglund (US 6,044,411) and further in view of Sidhu et al. (US 5,884,322), and rejected Claims 4, 6, 7, 11, 13, 14, 18, 20 and 21 under 35 U.S.C. § 103 as being unpatentable over Berglund (US 6,044,411) and Sidhu et al. (US 5,884,322) and further in view of Lortz et al. (US 6,041,364). Appellants show error in such rejection as follows.

The Examiner is using improper hindsight analysis in rejecting the claims of Group II. It is error to reconstruct the patentee's claimed invention from the prior art by using the patentee's claims as a "blueprint". When prior art references require selective combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight obtained from the invention itself. *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 227 USPQ 543 (Fed. Cir. 1985). Further, as stated by the Federal Circuit, "virtually all [inventions] are combinations of old elements." Environmental Designs, Ltd. v. Union Oil Co., 713 F.2d 693, 698, 218 USPQ 865, 870 (Fed. Cir. 1983); see also Richdel, Inc. v. Sunspool Corp., 714 F.2d 1573, 1579-80, 219 USPQ 8, 12 (Fed. Cir. 1983) ("Most, if not all, inventions are combinations and mostly of old elements."). Therefore an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be "an illogical and inappropriate process by which to determine patentability." Sensonics, Inc. v. Aerosonic Corp., 81 F.3d 1566, 1570, 38 USPQ2d 1551, 1554 (Fed. Cir. 1996). To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness.

In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed. *In re Rouffet*, 149 F.3d 1350, 47 USPQ 2d 1453 (Fed. Cir. 1998). "[w]hen determining the patentability of a claimed invention which combines two known elements, 'the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.'" *See In re Beattie*, 974 F.2d 1309, 1311-12, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992) (quoting Lindemann *Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984)).

As rationale for making the combination, the Examiner states:

> "Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included said third instructions, as disclosed by Sidhu, in said computer program product, as disclosed by Berglund, for the advantage of providing a means for appropriating identifications in a manner which is consistent with input/output drawer use (I.e. network use), thereby reducing the number of unique identifications (i.e. the number of identifications) that remain dormant because of inactivity on said input/output drawer (i.e. the server) which owns those identifications (See Sidhu, col. 4, lines 17-21)."

Applicants show that this in improper hindsight analysis as the expressed purpose of the Berglund reference is to change Berglund's unique physical address when the hardware is relocated by re-cabling (Berglund Col. 7, lines 40-67). The Examiner has expressly equated Berglund's unique physical address with the claimed 'unique identifier' (see above discussion regarding Claims 1, 8 and 15). Modifying the teachings of Berglund such that that each of the plurality of input/output drawers maintains its same unique identifier (i.e. Berglund's unique physical address) even when a new input/output drawer has been added to the data processing system would defeat the entire purpose of the teachings of Berglund, as Berglund's unique physical addresses would not change in such a scenario even upon system reconfiguration (by adding new drawers), thereby defeating Berglund's express desire of being able to easily physically locate relocated devices (Berglund Col. 2, lines 33-53; Col. 4, lines 22-24). The only

motivation for such a modification - since it would otherwise expressly defeat the desired results of the Berglund teachings - comes from Applicants' own patent specification, which is improper hindsight analysis. Therefore, the claims in Group II are shown to have been erroneously rejected by an improper combination of the cited references.

III. In summary, the Berglund reference does not teach assigning a unique identify to each of a plurality of input/output drawers and using such unique identifier by the operating system to identify the plurality of drawers regardless of how the drawers are interconnected by cable. Rather, Berglund expressly teaches that both the physical and logical identifiers may change upon re-cabling. As to the 35 USC 103 rejection, the Examiner is erroneously using Applicants' own patent specification for motivation to combine the references - which is improper hindsight analysis - as the modification would defeat the expressed desires and teachings of the primary Berglund reference. Thus, it is respectfully urged that all claims have been erroneously rejected, and therefore Appellants request that the Board reverse the rejection of such claims.

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APPENDIX OF CLAIMS

The text of the claims involved in the appeal are:

1. A method of managing input/output drawers within a data processing system, the method comprising:

assigning a unique identifier to each of a plurality of input/output drawers; and

storing the unique identifier in memory;

wherein the unique identifier is used by an operating system to identify the plurality of input/output drawers regardless of how the input/output drawers are interconnected by cables, such that physical addresses used when accessing devices contained within said plurality of input/output drawers do not change when reconfiguring at least one of said plurality of input/output drawers within the data processing system by physical insertion, physical removal or physical rearrangement, wherein the physical addresses that do not change include physical addresses used when accessing devices contained within the reconfigured drawer(s).

2. The method as recited in claim 1, further comprising:

responsive to a determination that a new input/output drawer has been added to the data processing system, assigning a new unique identifier to the new input/output drawer, wherein the new unique identifier is different from any of the unique identifiers previously assigned, such that each of the plurality of input/output drawers maintains the same unique identifier.

3. The method as recited in claim 1, wherein the method is performed in a service processor.

4. The method as recited in claim 2, wherein the unique identifier and the new unique identifier are stored in a device tree.

5. The method as recited in claim 2, wherein the unique identifier comprise device nodes and location codes.

6. The method as recited in claim 4, wherein the device tree is stored in a system memory.

7. The method as recited in claim 2, further comprising:

updating a device tree to reflect a configuration of the data processing system after inclusion of the new input/output drawer.

8. A computer program product in a computer readable media for use in a data processing system for managing input/output drawers within the data processing system, the computer program product comprising:

first instructions for assigning a unique identifier to each of a plurality of input/output drawers; and

second instructions for storing the unique identifier in memory;

wherein the unique identifier is used by an operating system to identify the plurality of input/output drawers regardless of how the input/output drawers are interconnected by cables, such that physical addresses used when accessing devices contained within said plurality of

input/output drawers do not change when reconfiguring at least one of said plurality of input/output drawers within the data processing system by physical insertion, physical removal or physical rearrangement, wherein the physical addresses that do not change include physical addresses used when accessing devices contained within the reconfigured drawer(s).

9. The computer program product as recited in claim 8, further comprising:

third instructions, responsive to a determination that a new input/output drawer has been added to the data processing system, for assigning a new unique identifier to the new input/output drawer, wherein the new unique identifier is different from any of the unique identifiers previously assigned, such that each of the plurality of input/output drawers maintains the same unique identifier.

10. The computer program product as recited in claim 8, wherein said first and second instructions are executed in a service processor.

11. The computer program product as recited in claim 9, wherein the unique identifier and the new unique identifier are stored in a device tree.

12. The computer program product as recited in claim 9, wherein the unique identifier comprise device nodes and location codes.

13. The computer program product as recited in claim 11, wherein the device tree is stored in a system memory.

14. The computer program product as recited in claim 9, further comprising:

fourth instructions for updating a device tree to reflect a configuration of the data processing system after inclusion of the new input/output drawer.

15. A system for managing input/output drawers within a data processing system, the system comprising:

first means for assigning a unique identifier to each of a plurality of input/output drawers; and

second means for storing the unique identifier in memory;

wherein the unique identifier is used by an operating system to identify the plurality of input/output drawers regardless of how the input/output drawers are interconnected by cables, such that physical addresses used when accessing devices contained within said plurality of input/output drawers do not change when reconfiguring at least one of said plurality of input/output drawers within the data processing system by physical insertion, physical removal or physical rearrangement, wherein the physical addresses that do not change include physical addresses used when accessing devices contained within the reconfigured drawer(s).

16. The system as recited in claim 15, further comprising:

third means, responsive to a determination that a new input/output drawer has been added to the data processing system, for assigning a new unique identifier to the new input/output drawer, wherein the new unique identifier is different from any of the unique identifiers previously assigned, such that each of the plurality of input/output drawers maintains the same unique identifier.

17. The system as recited in claim 15, wherein said first and second means are executed in a service processor.

18. The system as recited in claim 16, wherein the unique identifier and the new unique identifier are stored in a device tree.

19. The system as recited in claim 16, wherein the unique identifier comprise device nodes and location codes.

20. The system as recited in claim 18, wherein the device tree is stored in a system memory.

21. The system as recited in claim 16, further comprising:

fourth means for updating a device tree to reflect a configuration of the data processing system after inclusion of the new input/output drawer.